

QUARTERLY REPORT

(for January - March 1992)

Contract No. NAS5-31363

OCEAN OBSERVATIONS WITH EOS/MODIS: Algorithm Development and Post Launch Studies

by

Howard R. Gordon
University of Miami
Department of Physics
Coral Gables, FL 33124

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Following the format of my monthly reports, I shall describe developments (if any) in each of the major task categories.

1. Atmospheric Correction Algorithm Development.

a. Near-term Objectives: To quantify the relationship between the spectral variation of the aerosol optical thickness and the spectral variation in the single-scattered aerosol reflectances. To find an efficient scheme for including surface roughness generated by wind in a Monte Carlo model of radiative transfer in spherical shell atmospheres.

b. Task Progress: During the February we acquired (free) the 702 scattering phase functions that were generated by Phillips Laboratory for the LOWTRAN-6 radiative transfer program. These phase functions were to be used to test our own Mie scattering computations for generating phase functions to examine the spectral variation in the single-scattered aerosol reflectance, a key ingredient in atmospheric correction. The appropriate Mie scattering programs have been modified for the LOWTRAN model size distributions and for operation on our DECstation 5000 computer. Initial testing resulted in nearly perfect agreement between the LOWTRAN extinction and phase functions and our own computations. An efficient scheme for including surface roughness generated by wind in a Monte

Carlo model of radiative transfer in spherical shell atmospheres was developed.

c. Anticipated Activities During the Next Quarter: Starting in May a new graduate student will begin computations of model aerosol phase functions described above for the MODIS spectral bands. The scheme for including surface roughness generated by wind in a Monte Carlo model of radiative transfer will be extensively tested during the next quarter.

2. Whitecap Correction Algorithm.

a. Near-term Objectives: Initiate discussions with NOAA to borrow the CCD camera for further testing during fall 1992.

b. Task Progress: Discussions initiated.

c. Anticipated Activities During the Next Quarter: Formalize a schedule for delivery of the instrument to Miami and its return to NOAA.

3. In-water Radiance Distribution Schedule.

a. Near-term Objectives: Modify radiance camera for MODIS spectral bands.

b. Task Progress: Filters have been ordered for the radiance distribution camera to complete the set required for the MODIS bands.

c. Anticipated Activities During the Next Quarter: Instrument will be tested in a lake environment.

4. Residual Instrument Polarization.

a. Near-term Objectives: None.

b. Task Progress: None.

c. Anticipated Activities During the Next Quarter: None.

5. Direct Sun Glint Correction.

a. Near-term Objectives: None.

b. Task Progress: None.

c. Anticipated Activities During the Next Quarter: None.

6. Prelaunch Atmospheric Correction Validation Schedule.

a. Near-term Objectives: Modify sky radiance camera for MODIS spectral bands. Learn how to invert sky radiance to obtain aerosol optical properties.

b. Task Progress: Filters have been ordered for the sky radiance camera to complete the set required for the MODIS bands.

c. Anticipated Activities During the Next Quarter: Possible testing the sky radiance camera in conjunction with the testing of the in-water radiance distribution camera.

d. Publications: A manuscript "Retrieval of the Columnar Aerosol Phase Function and Single Scattering Albedo from Sky Radiance over the Ocean: Simulations," by M. Wang and H.R. Gordon, was submitted to Applied Optics. It describes a possible scheme for inverting sky radiance measurements to obtain aerosol properties. The reported work received partial support from the project

7. Detached Coccolith Algorithm and Post Launch Studies.

a. Near-term Objectives: None.

b. Task Progress: None.

c. Anticipated Activities During the Next Quarter: None.

8. Post Launch Vicarious Calibration/Initialization.

a. Near-term Objectives: None.

b. Task Progress: None.

c. Anticipated Activities During the Next Quarter: None.

9. Single Scattered Aerosol Radiance and PAR Algorithms.

a. Near-term Objectives: None.

b. Task Progress: None.

c. Anticipated Activities During the Next Quarter: None.

OTHER DEVELOPMENTS

A major portion of the March effort was spent in preparation of a presentation on atmospheric correction issues and plans for the MODIS Science Team. The presentation is to be given on April 15.